

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

KAIST IP US LLC,

Plaintiff

V.

SAMSUNG ELECTRONICS CO., LTD.;
SAMSUNG ELECTRONICS AMERICA,
INC.; SAMSUNG SEMICONDUCTOR,
INC.; SAMSUNG AUSTIN
SEMICONDUCTOR, LLC;
GLOBALFOUNDRIES INC.;
GLOBALFOUNDRIES U.S. INC.; and
QUALCOMM INC.,

Defendants.

NO. 2:16-cv-01314-JRG-RSP

JURY TRIAL DEMANDED

**DEFENDANTS' RENEWED MOTION FOR JUDGMENT AS A MATTER OF LAW
ON NON-INFRINGEMENT AND INVALIDITY**

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Rules

Fed. R. Civ. P. 50(a)2

I. INTRODUCTION

All Defendants move for judgment as a matter of law (“JMOL”) as to non-infringement and invalidity of all asserted claims of U.S. Patent No. 6,885,055 (“the ’055 Patent”). In light of the evidence at trial, Defendants are entitled to JMOL on the following grounds.

A. *Non-infringement.* Plaintiff failed to establish that the accused products satisfy limitations required by every asserted claim.

First, Plaintiff failed to establish that the accused products have a “gate which is formed on said . . . second oxide layer” because it is undisputed that the alleged gate is always formed on a hafnium oxide layer that is in between the gate and the alleged second oxide layer. Thus, the gate is not “formed on” the second oxide layer as the claims require.

Second, Plaintiff failed to establish that the accused products have a “first oxide layer” because Plaintiff accused a combination of distinct hafnium oxide and silicon dioxide layers, neither of which individually satisfies all limitations of the “first oxide layer.”

Third, Plaintiff failed to establish that the accused products have a “first oxide layer . . . with a thickness greater or equal to that of the gate oxide” because Plaintiff relied on measurements that were purportedly “equal with manufacturing variation,” which is inconsistent with the literal claim language, and Plaintiff fails to present substantial evidence of equivalents.

Finally, Plaintiff failed to establish that the accused products have a “wall-shape” Fin active region because they in fact have a parabolic-shaped Fin active region.

B. *No Holding Company Liability.* Globalfoundries Inc. (“GFI”), a holding company, is entitled to JMOL because there was no evidence of its direct infringement, nor any claim of indirect infringement, joint infringement, agency, or alter ego to permit a verdict of joint liability or disregard of the corporate form.

C. Invalidity. Defendants are entitled to JMOL of invalidity because the evidence was clear and convincing that the '055 Patent is obvious or anticipated by *Mizuno* and other prior art.

II. BACKGROUND

KAIST IP US LLC, now KIPB LLC ("Plaintiff"), brought this lawsuit on November 29, 2016, alleging that Defendants infringe the '055 Patent. At the close of the parties' cases, Defendants moved for JMOL under Rule 50(a) on non-infringement and invalidity, which were denied. 6/14/18 PM 203:9–12; 205:9–20; 206:18–207:4; 207:9–210:21; 217:24–218:8.

III. LEGAL STANDARD

"Judgment as a matter of law is proper when 'a reasonable jury would not have a legally sufficient evidentiary basis to find for the party on that issue.'" *Abraham v. Alpha Chi Omega*, 708 F.3d 614, 620 (5th Cir. 2013) (quoting Fed. R. Civ. P. 50(a)). The non-moving party must identify "substantial evidence" to support its positions. *TGIP, Inc. v. AT&T Corp.*, 527 F. Supp. 2d 561, 569 (E.D. Tex. 2007). "Substantial evidence is more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1363 (Fed. Cir. 2004).

IV. ARGUMENT

A. DEFENDANTS ARE ENTITLED TO JMOL ON NON-INFRINGEMENT

It was Plaintiff's burden to establish with substantial evidence that the accused products satisfy every limitation of the asserted claims, literally or by equivalents. Where "no reasonable fact finder could determine that the accused devices meet every limitation of the properly construed claims[,] . . ." JMOL should be granted. *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999). Plaintiff failed to demonstrate that several limitations are met literally or by equivalents, leaving the jury without substantial evidence to support a finding of infringement. JMOL of non-infringement should, therefore, be granted.

1. The Asserted Claims

At trial, Plaintiff asserted independent claims 1 and 13 and dependent claims 2-6, 11-12, and 15-17 of the '055 Patent. Claim 1 recites a double-gate FinFET device having a number of features, including the following limitations most pertinent to this motion:

a Fin active region which is a wall-shape single crystalline silicon on a surface of the bulk silicon substrate and connected to said bulk silicon substrate;

a second oxide layer which is formed up to a certain height of the Fin active region from the surface of bulk silicon substrate;

a gate oxide layer which is formed on both side-walls of the Fin active region protruded from said second oxide layer;

a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;

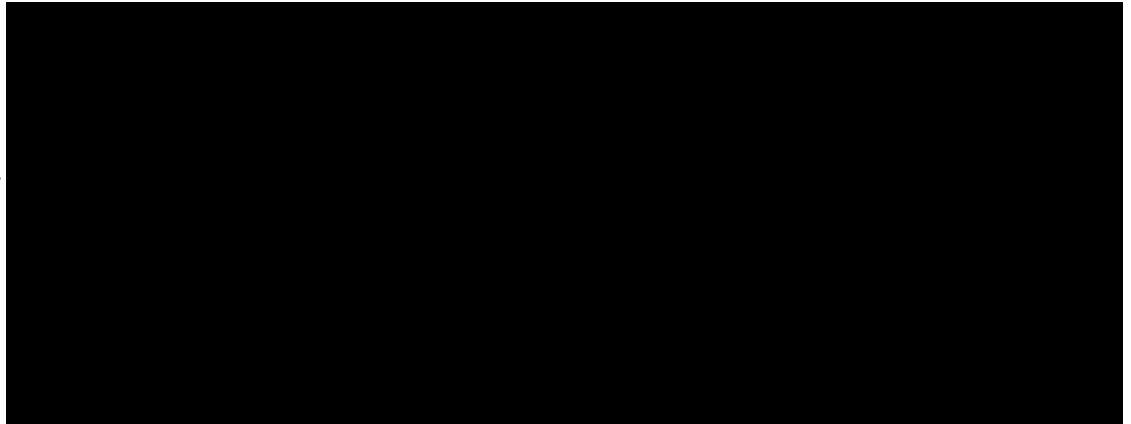
a gate which is formed on said first and second oxide layer.

DX-001 12:2-27 (emphasis added). Independent claim 13 includes these same limitations, among others. *Id.* 13:40-14:22; 6/12/18 PM 15:3-12. Plaintiff failed to demonstrate that the accused products infringe these claims, literally or by equivalents.

2. The Accused Features of the Defendants' Products

The accused products are FinFET devices. *See* 6/12/18 AM (Kuhn) 72:6-15. As shown below left (DX-430), these accused FinFET devices have a "[REDACTED] [REDACTED]" 6/12/18 Sealed Portion No. 1 (Kuhn) 7:15-22. They have "a lighter-colored layer [blue] that wraps all the way around that Fin active region [orange], which is a silicon dioxide [SiO₂] layer" formed on the Fin active region, as shown below right (6/13/18 PM (Wallace) 169:25-171:17). 6/12/18 PM (Kuhn) 59:9-22, 97:20-23; 6/13/18 PM (Wallace) 169:25-170:17. "[O]n top of that silicon dioxide layer, there is a Hafnium oxide [HfO, black] layer that's a darker ring." 6/12/18 PM (Kuhn) 59:23-60:3, 62:1-7, 97:20-23; 6/13/18 PM (Wallace) 169:25-171:6.

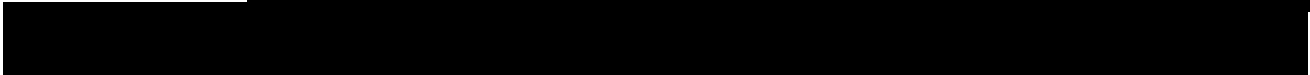
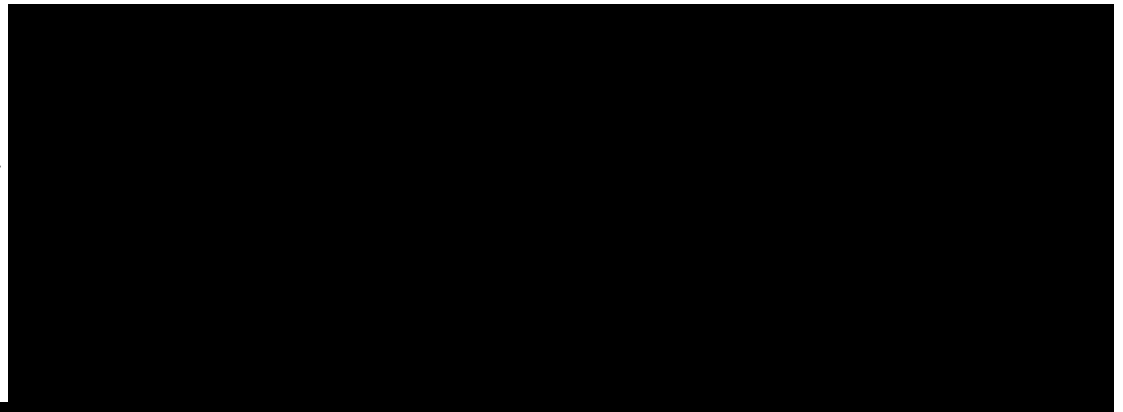
DX-430.



[REDACTED] (PX0373.120) and

[REDACTED] 6/12/18 AM Sealed Portion No. 1 9:1-10:7.

PX0373.120.



[REDACTED] 6/12/18 AM Sealed Portion No. 1 (Kuhn)

11:19-12:8, 17:5-22; PX-854.15; 6/13/18 PM (Wallace) 169:25-171:6. A gate (green) is formed on the hafnium layer (black). 6/12/18 PM (Kuhn) 59:23-60:6; 6/13/18 PM (Wallace) 171:7-17.

The hafnium layer is distinct from the two silicon dioxide layers: it has a different “dielectric constant” (6/12/18 PM (Kuhn) 60:7-15), and is “formed by different processes,”

¹ Select demonstratives are presented here merely as an aid to assist the Court in understanding the record evidence and testimony. The demonstratives themselves are, of course, not evidence. 6/15/18 PM 34:22-35:7 (jury instructions concerning demonstratives).

(61:7-62:7) by “different machines” (62:20-22), and “at different times” (62:23-25). The addition of an intervening hafnium layer to non-planar transistors, like those at issue here, occurred years *after* the ’055 Patent issued (66:13-16); far from trivial, this is considered the most significant advance in transistor technology in 60 years. 6/12/18 PM 67:19-68:17.

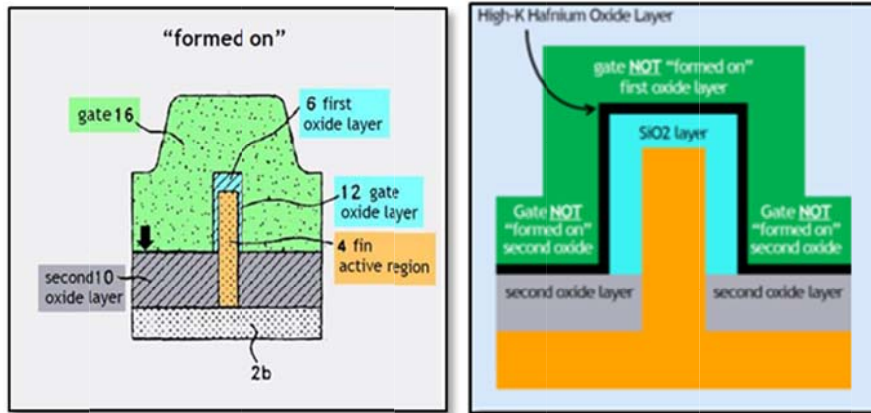
Given this post-issuance development, it is not surprising that the ’055 Patent does *not* claim or contemplate intervening layers like the hafnium layer in the accused products. Indeed, the inventor admitted that he deliberately sought to design and patent a FinFET *without using* high-k material, such as the hafnium layer, which had not yet proven commercially viable. 6/11/18 PM (Lee) 86:11-25; *id.* 23-25 (“At the time of my research, we wanted to show that we can create an advanced performance transistor structure without using high-k”); 6/12/18 PM (Kuhn) 60:11-12, 63:21-64:4 (Dr. Kuhn testifying that the patent “doesn’t refer to high-k materials”). Nevertheless, Plaintiff’s expert, Dr. Kuhn, admitted that unlike devices at the time of patenting, FinFET devices at today’s dimensions, such as the accused devices, “wouldn’t work” without the hafnium layer. *Id.* 119:19-120:6.

3. Plaintiff Failed to Prove the Presence of “a Gate Which Is Formed on Said . . . Second Oxide Layer.”

There was no genuine issue of fact for the jury to resolve in determining whether the accused products include a “gate . . . formed on [the] second oxide layer.” Rather, the undisputed evidence establishes that this limitation is not met, as a matter of law.

The claims require a specific layering: the second oxide layer [gray, below left] to be formed on the silicon substrate up to a height next to (not on) the fin, and a gate [green, below left] to be formed on the second oxide layer. The parties did not request construction of “formed on,” and the plain and ordinary meaning applies. 6/15/18 AM 43:15-17 (jury instructions requiring plain and ordinary meaning).

Fig. 7,
DX-001
(’055 Patent)
(Annotated).



Demonstrative
(Illustrating layers at
sides of the fin).

Plaintiff could not and did not establish a gate formed on the second layer. Plaintiff only

6/12/18 AM Sealed Portion No. 1, 9:1-10:7. Dr. Kuhn confirmed

Id. 9:22-24; 9:1-21; PX00853.51. Thus,

But, there is no dispute that Defendants’ gate is always formed on the hafnium layer, not the silicon dioxide layer. 6/12/18 PM 59:23-60:6 (noting the gate wraps all the way around the hafnium layer); 6/14/18 AM 28:7-30:5. Magistrate Judge Payne correctly recognized and relied on this fact in recommending denial of Plaintiff’s motion for summary judgment of infringement. Dkt. 459 at 2 (finding “[t]he gate electrode is then *formed on* the HfO [hafnium] layer”) (citing Dkt. 228-19 ¶121); GF_KAISTIP00000239) (emphasis added). There is likewise no dispute that

6/12/18 PM

61:7-10; 6/12/18 Sealed Portion No. 1, 11:19-12:8; PX0853.81 [REDACTED]

[REDACTED] PX-854.15; PX-373.120. Thus, instead of the gate being formed on the alleged “second oxide layer,” the gate is indisputably formed on something else—the intervening hafnium layer. This precludes infringement as a matter of law.

Dr. Kuhn ignored the undisputed evidence and failed to address the [REDACTED]

[REDACTED] 6/12/18 AM Sealed Portion No. 1 21:13-23:10. She merely testified [REDACTED] *Id.*

23:4-5. But, the claims do not require an SiO₂ layer at all, and her testimony says nothing, even in a conclusory way, about whether a person of ordinary skill would understand that the gate is formed on the second oxide layer when there is notwithstanding another layer in between.

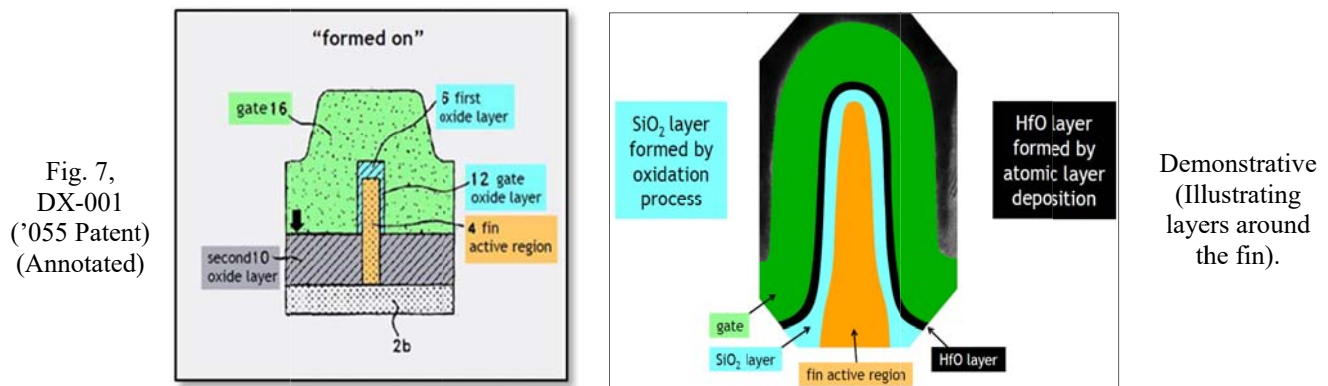
Dr. Kuhn nevertheless went on to pronounce that the [REDACTED]

[REDACTED]” 6/12/18 AM Sealed Portion No. 1, 23:6-10. This is insufficient as a matter of law because an expert “just saying that something is so does not make it true, especially when there is no record support” and the evidence indicates “otherwise.” *Dominion Energy, Inc. v. Alstom Grid LLC*, 725 F. App’x 980, 986 (Fed. Cir. 2018). The plain meaning of “formed on” does not permit an intervening layer because the claims and patent do not mention or suggest intervening layers, consistent with the inventor’s admission that he sought to create a transistor without high-k material. *Cf. Nitride Semiconductors Co., v. RayVio Corp.*, 2018 WL 2183270, at *5-6 (N.D. Cal. May 11, 2018) (finding the “ordinary and customary meaning” of “form[ing/ed] on” means “form(ing/ed) in contact with and above” when “[n]othing in the specification mentions intervening layers or suggests that the inventors contemplated that intervening layers could be introduced”). Here, the undisputed evidence is that the accused gate is formed on the hafnium layer, not the accused second oxide layer. JMOL is thus warranted.

4. Plaintiff Failed to Prove the Presence of the “First Oxide Layer.”

There was also no genuine issue of fact for the jury to resolve in determining whether the accused products meet the “first oxide layer” limitation. The undisputed evidence establishes that this limitation is likewise not met, as a matter of law.

The claims require the “first oxide layer” to be “formed on the upper surface of said Fin” and the gate to be “formed on *said first . . . oxide layer*.” Here too the claims recite a structural relationship, this time between a first oxide layer, fin and gate, as shown in the figure below, left.



Plaintiff could not and did not establish that the accused products have a layer that meets all requirements for the “first oxide layer.” Instead, Plaintiff identified [REDACTED]

[REDACTED] 6/12/18 AM Sealed Portion No. 1, 21:22-22:4, 13:14-15:9; *see also* 6/13/18 PM (Wallace) 169:25-171:17. It is, however, undisputed that the silicon dioxide layer and hafnium layer are two *different* layers, formed by “separate processes, [with] separate properties, [and at] separate times.” 6/14/18 PM 199:17-200:5; 6/12/18 PM (Kuhn) 61:7-10 (different processes); *id.* 62:20-22 (different machines); *id.* 62:23-25 (different times); 6/13/18 PM (Samavedam) 119:14-15, 117:14-119:20; 6/13/18 PM (Wallace) 177:14-180:19. Because no single “layer” meets all of the requirements placed on the “first oxide layer,” no reasonable jury could find infringement as a matter of law.

With neither the silicon dioxide layer nor hafnium layer alone able to satisfy the “first oxide layer” limitation, Plaintiff offered a literal infringement theory that converted two distinct layers into a two-layer **combination** layer. Plaintiff went on to contend that, because the “first oxide layer” is claimed as “a first oxide layer,” the claims permit more than one first oxide layer, as “a” can be “one or more.”² But, while the article “a” **may** mean “one or more” in the context of open-ended claims, other express requirements in the claims cannot be ignored:

[T]he question [of] whether ‘a’ can serve to negate what is required by the language following ‘a’: . . . It cannot. For a dog owner to have ‘a dog that rolls over and fetches sticks,’ it does not suffice that he have two dogs, each able to perform just one of the tasks.

In re Varma, 816 F.3d 1352, 1363 (Fed. Cir. 2016); *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1343 (Fed. Cir. 2008).

Here, the recited “first oxide layer” cannot be made up of two separate layers formed at different times, as only one can be “first.” And, the additional express requirements placed on the “first oxide layer” cannot be met by the accused silicon dioxide or hafnium layer alone. The silicon dioxide layer is formed on the upper surface of said Fin active region, but no gate is formed on this layer. The hafnium layer, in turn, has a gate formed on it, but is not formed on the upper surface of the Fin active region, as required. Thus, neither the silicon dioxide layer nor the hafnium layer satisfies the claims’ requirements for the “first oxide layer,” and as a result, no

² 6/15/18 (Pl.’s Closing) 77:24-78:7 (“I want you to remember a very important rule about the claims. You’ll see the claims say a first oxide layer, a gate oxide layer, and a second oxide layer. But that word ‘a,’ which seems so important--unimportant to us as lay people, is incredibly important in the patent. It means one or more. You can have more than one gate oxide layer. You can have more than one first oxide layer. You can have more than one second oxide layer.”).

reasonable jury could have found infringement under Plaintiff's erroneous two-layer theory.³

JMOL of non-infringement should accordingly be granted.

5. Plaintiff Failed to Prove the Presence of “a First Oxide Layer . . . with a Thickness Greater or Equal to that of the Gate Oxide.”

The claims require a “gate oxide layer which is formed on both side-walls of the Fin,” and a “first oxide layer with a thickness greater or equal to that of the gate oxide.” DX-001 at 12:2-27. No reasonable jury could have found that the accused products have a first oxide layer with a thickness greater or equal to the gate oxide on both sides of the fin. Plaintiff's own evidence showed that the thickness of the accused first oxide layer is *less than* that of the accused gate oxide layer.⁴

PX0843.

³ Dr. Kuhn's testimony that [REDACTED] (6/12/18 AM Sealed Portion No. 1 12:9-11), is at most an argument that the accused products have a structural equivalent to the claimed invention. But Plaintiff did *not* raise its two-layer theory under the doctrine of equivalents, precluding a finding of infringement as a matter of law.

⁴ Dr. Kuhn's contention that “[REDACTED] (6/12/18 AM Sealed No. 1 18:16-20) is not substantial evidence that the “[REDACTED]” and “[REDACTED]” [REDACTED] [REDACTED] As described above, the hafnium layer is but one layer (the silicon dioxide layer, the other) in Plaintiff's two-layer-combination that it alleged is both the first and gate oxide layers.

In PX0843 above,⁵ [REDACTED]

[REDACTED]

[REDACTED] Dr. Kuhn was thus forced to always qualify her infringement opinion by asserting that the thicknesses of the accused “first oxide layer” and “gate oxide layer” are “considered equal *with manufacturing variation*.”⁷ But that theory fails as a matter of law, both literally and under the doctrine of equivalents.

a. There is not substantial evidence of literal infringement.

Plaintiff has not presented sufficient evidence to establish literal infringement of the “thickness” limitation. “To establish literal infringement, every limitation set forth in a claim must be found in an accused product, *exactly*.” *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed. Cir. 1995) (emphasis added). The undisputed evidence falls well short of establishing that the accused products *exactly* meet the claim requirement that the thickness of the first oxide layer is equal to or exceeds the thickness of the gate oxide layer.

First, Plaintiff’s theory disregards the plain language of the claims. Unlike here, when patentees want to avoid placing “a strict numerical boundary” on a “specified parameter,” they use “words of approximation.” *Anchor Wall Sys. v. Rockwood Retaining Walls*, 340 F.3d 1298, 1310-11 (Fed. Cir. 2003) (internal quotation marks omitted). These might include terms such as “generally,” “substantially,” “approach each other,” “close to,” “substantially equal,” and

⁵ 6/12/18 AM Sealed Portion No. 1 18:3-15 [REDACTED]

⁶ 6/12/18 AM Sealed Portion No. 1 11:19-12:8.

⁷ 6/12/18 AM Sealed Portion No. 1 (Kuhn) 18:21-19:2 ([REDACTED])

“closely approximate.” *Id.*; *Andrew Corp. v. Gabriel Elecs. Inc.*, 847 F.2d 819, 821-22 (Fed. Cir. 1988) (noting that such terms are ubiquitously used in patent claims, accepted in patent examination and upheld by courts). By contrast, when “broadening words that ordinarily receive some leeway . . .” are not used, patent terms must be interpreted precisely. *Jeneric/Pentron, Inc. v. Dillon Co.*, 205 F.3d 1377, 1381 (Fed. Cir. 2000) (citation omitted).

Here, patentee did not use “words of approximation” for this limitation.⁸ Instead, the claims expressly require the “first oxide layer” to have “a thickness greater or equal to that of the gate oxide.”⁹ “**Greater or equal to**” is a mathematically precise, numerical boundary to **lesser than**; there is no overlap or gap in these two ranges. Thus, the express claim language provides no allowance for **any** variation—manufacturing or otherwise. There is simply no basis for Dr. Kuhn to read a “manufacturing variation” into the limitation. *See Takeda Pharm. Co. v. Zydus Pharm. USA, Inc.*, 743 F.3d 1359, 1363–64 (Fed. Cir. 2014) (“[T]here is no indication in the claim that 400 μm was intended to mean anything other than exactly 400 μm . To the contrary, the phrase ‘400 μm or less’ is not qualified by the word ‘about’ or any other indicator of imprecision.”). If the patentee intended to import “manufacturing variation” into this claim limitation, he could have done so using words of approximation.¹⁰ He did not.

⁸ Dr. Kuhn failed to even quantify what a reasonable “manufacturing variation” would be, leaving her opinion that the thickness limitation is met unsupported and conclusory.

⁹ While no words of approximation appear in the independent claims, the patentee clearly knew how to claim an approximation. *See, e.g.*, ’055 Patent Claim 11 (reciting a “doping junction depth . . . **around** 0 nm to 50 nm above the reference level”); Claim 12 (reciting a “doping junction depth . . . **around** 0 nm to –50 nm below the reference level”) (emphasis added); *see also Jeneric*, 205 F.3d at 1381 (“assigning numerical precision to . . . ranges, is particularly appropriate when other variables . . . explicitly use qualifying language”).

¹⁰ For other claim limitations where the patentee specifically used words of approximation (*e.g.*, claims 11 and 12), the Court found that use of such words “makes clear that in this field exact junction depths are not the norm but rather **manufacturing tolerances** impact the junction

Second, the Federal Circuit has already rejected Plaintiff’s argument that manufacturing tolerances can be read into claim terms. To the contrary, “[m]anufacturing tolerances are immaterial to the interpretation of claim language.” *Senmed, Inc. v. Richard-Allan Med. Indus., Inc.*, 888 F.2d 815, 820 n.10 (Fed. Cir. 1989). Manufacturing variations—the disparity between an actual measurement of a manufactured product and the target measurement in the product specification—reflect a determination by the manufacturer *as of the time of manufacture* of what level of variation is commercially acceptable. These commercially acceptable variations do not reflect an intrinsic property of the claimed apparatus *as of the time of the patent application*. As the Federal Circuit explained, the meaning of a patent term is not subject to revision or alteration by subsequent contract between the patentee and its suppliers. In *Middleton, Inc. v. 3M*, 311 F.3d 1384, 1389 (Fed. Cir. 2002), the Federal Circuit rejected the contention that a claim limitation requiring “uniform” thickness was infringed so long as the accused film product’s “thickness falls within manufacturing tolerances”:

The meaning of patent terms depends on the usage of those terms in context by one of skill in the art at the time of application. Patent terms are not subject to later revision by a supply contract.

Id. (citation omitted). Similarly, having not timely sought a construction based on “manufacturing variation” here (*see id.*), Plaintiff could not read them into the plain meaning of the limitation.

Finally, Dr. Kuhn did not demonstrate that *any* accused product, much less *all* of them, satisfied this limitation. Although she made the conclusory statement that [REDACTED]

depth formation *such that approximations are used*.” Dkt. 179 at 42 (emphasis added). The Court did not extend such approximations and tolerances to the independent claims.

[REDACTED] 6/12/18 Sealed Portion No. 1 17:7-10,
19:3-9. The [REDACTED]

[REDACTED] see PX0854, PX0208, PX0373, and Plaintiff adduced testimony that “a large number of factors” determine the relative thickness of the accused “first oxide layer” and “gate oxide layer” in a given transistor. 6/14/18 AM 98:4-99:3. Dr. Kuhn offered no evidence whatsoever to establish that the measured and non-measured “products operate similarly with respect to the claimed limitation[,]” such that the jury could find that the former are representative of the latter. *See Spansion, Inc. v. ITC*, 629 F.3d 1331, 1351 (Fed. Cir. 2010). Moreover, the claims require the first oxide layer to have “a thickness greater or equal to that of the gate oxide.” Although Dr. Kuhn did not submit her calculations of relative thickness into evidence, it cannot be disputed that in at least one of the TEMs admitted, [REDACTED]

[REDACTED] *See supra* 10; PX0843; 6/12/18 AM Sealed No. 1 (Kuhn) 18:3-19:2. Another [REDACTED]

[REDACTED]¹
Because one or more of the putatively representative TEMs does not meet this limitation, as a matter of law, the jury could not conclude that even the few accused chips from which the TEMs were generated infringe, much less all of the other products accused in this case.

b. There is not substantial evidence of DOE infringement.

An accused device may infringe by equivalents if it performs substantially the same function, in substantially the same way, to achieve substantially the same result as the claimed invention. *MHL Tek, LLC v. Nissan Motor Co.*, 691 F. Supp. 2d 698, 706 (E.D. Tex. 2010).

¹¹ DX-430; 6/14/18 AM 30:6-33:3 (Subramanian); 6/13/18 PM (Wallace) 161:19-171:6; 6/13/18 PM (Samavedam) 87:16-90:2; 6/13/18 AM (Kim) 114:11-115:6.

“Generalized testimony as to the overall similarity between the claims and the accused infringer’s product or process will not suffice.” *Tex. Instr. V. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1567 (Fed. Cir. 1996). Here, Plaintiff failed to present sufficient evidence that the accused products infringe the “thickness” limitation under the doctrine of equivalents (“DOE”).

First, Plaintiff failed to provide substantial evidence on the insubstantiality of the differences between the actual claim limitations and the accused products. Dr. Kuhn testified that the accused products perform substantially [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] 6/12/18

AM Sealed Portion No. 1 20:11–21:5. This is not substantial evidence of infringement under the DOE for the thickness limitation. Dr. Kuhn’s opinion failed to compare the difference required by the claims: that is, between (a) the relative layer thicknesses required by the claims and (b) the relative layer thicknesses in the accused products. This difference (not how and why these layers prevent short circuiting) is what Dr. Kuhn had to—but did not—show is insubstantial.¹² *Akzo Nobel Coatings, Inc. v. Dow Chem. Co.*, 811 F.3d 1334, 1343 (Fed. Cir. 2016); *Gemalto S.A. v. HTC Corp.*, 754 F.3d 1364, 1374 (Fed. Cir. 2014).

¹² Plaintiff also noted that a function of the thickness limitation is to determine whether a gate is formed on top of the fin. Dkt. 93 at 11-12 (arguing that whether the “oxide layer” may play the role of allowing “either an operating gate or a structural feature protecting the transistor based on the thickness of the layer . . . is denoted by the claim language: ‘a first oxide layer which is formed on the upper surface of the Fin active region with a thickness greater or equal to that of the gate oxide.’”); Dkt. 113 at 2 (“the double-gate FinFET device comprises a first oxide layer having a thickness greater than (no gate on the top) or equal to (additional gate present on the top) that of the gate oxide.”). Dr. Kuhn also failed to address this function of the thickness limitation; thus, her function-way-result analysis fails for this additional reason.

Second, Dr. Kuhn’s bare-bones opinion is also legally insufficient because it relies on the exact same “manufacturing tolerances” she used for literal infringement. *Lear Siegler, Inc. v. Sealy Mattress Co.*, 873 F.2d 1422, 1425 (Fed. Cir. 1989) (“evidence and argument on the [DOE] cannot merely be subsumed in plaintiff’s case of literal infringement” even when “there was evidence and argument on literal infringement, that may also bear on equivalence”).

Third, JMOL is also warranted because Plaintiff’s equivalents theory vitiates the “thickness” limitation, in violation of the all-elements rule. *See Lockheed Martin Corp. v. Space Sys./Loral, Inc.*, 324 F.3d 1308, 1321 (Fed. Cir. 2003); *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39 n.8 (1997). Recognizing that [REDACTED]

[REDACTED] 6/12/18 AM Sealed Portion No. 1 18:21–19:2

[REDACTED] Dr. Kuhn testified

[REDACTED] *Id.* 20:11–16. This DOE theory fails as a matter of law, because it equates “greater than or equal to” with its polar opposite “less than,” impermissibly broadening the range of equivalents and vitiating the claim requirements. *See Moore U.S.A., Inc. v. Standard Reg. Co.*, 229 F.3d 1091, 1106 (Fed. Cir. 2000) (allowing a minority (*i.e.*, 47.8%) to be equivalent to the claim limitation of a “majority” (50.001%) would vitiate it, because “it would defy logic to conclude that a minority -- the very antithesis of a majority -- could be insubstantially different from a claim limitation requiring a majority . . .”). An oxide with a thickness **lesser than** that of another oxide is “the very antithesis” of an oxide with a thickness **greater than or equal to** the other oxide; it would “defy logic” to conclude that they are insubstantially different. *Id.* Yet that is what Dr. Kuhn opined to the jury. JMOL is therefore appropriate.

6. Plaintiff Failed to Prove the Presence of “a Fin Active Region Which is a Wall-Shape Single Crystalline Silicon.”

All asserted claims require a “wall-shape” fin. Dr. Kuhn cited images of Defendants’ products and concluded that “you can see the wall-shape Fins running this way down the image.” 6/12/18 AM 77:22-23; *id.* 76:9-78:9. But “just saying that something is so does not make it true” *Dominion*, 725 F. App’x at 986. The irrefutable evidence shows that the accused fin is parabola-shaped.¹³ This is critical because, unlike a wall, a parabola has no clear demarcations between its sides and upper-surface. Plaintiff had no rebuttal to this aside from bare denial. *Id.* 191:3-5. The only other evidence was Dr. Kuhn’s contention that a fin is *not* “wall-shape” unless the “fin shape and gates” are used “to create the fully depleted Fin active region.” 6/14/18 AM 131:1-132:24; 6/12/18 AM 77:5-8. She made the same assertion for validity. *Id.*¹⁴ But this theory fell apart when Dr. Kuhn conceded that “full depletion” is “not a requirement of that [wall-shape Fin active region] term.” 6/14/18 PM 186:17-24. Thus, Dr. Kuhn admitted that a necessary premise of her infringement opinion was not grounded in the claim language.

Plaintiff failed to present sufficient evidence that the accused products infringe the “wall-shape” limitation under the DOE. Plaintiff only relied on Dr. Kuhn’s testimony that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] 6/12/18 AM Sealed Portion No. 1 6:7-18. This threadbare

¹³ 6/14/18 AM 34:19-36:3, 114:6-7 (explaining a “parabola” is defined by geometry).

¹⁴ Dr. Kuhn’s “wall-shape” opinions must apply equally to validity and infringement. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001).

testimony fails to address whether the accused parabolic fin provides substantially the same function, in substantially the same way, to achieve substantially the same result as the claimed “wall-shape Fin active region.” *MHL Tek*, 691 F. Supp. 2d at 706. JMOL is thus warranted.

B. No Reasonable Jury Could Find GFI Liable for Infringement.

1. No reasonable jury could find that GFI directly infringed.

Plaintiff presented no evidence at trial to show that GFI (Globalfoundries Inc.) infringed the '055 Patent. It was undisputed at trial that GFI is a holding company with no operations—including no sales, manufacturing, or other ordinary business activities. 6/13/18 AM 61:12–15, 72:2–74:16; 6/13/18 PM 50:13–14, 75:17–20. A holding company that commits no act of infringement cannot infringe as a matter of law. Thus, GFI is entitled to JMOL. *See Rodriguez v. Riddell Sports, Inc.*, 242 F.3d 567, 577–78 (5th Cir. 2001) (holding that parent holding company should be dismissed as a matter of law because it did not commit tortious acts).

Plaintiff relied on the limited deposition testimony of former Globalfoundries U.S. Inc. employee Jesse Abzug to explain declarations in GFI’s applications for registration of the GLOBALFOUNDRIES trademark. 6/13/18 AM 62:10–63:8. In the application to register that mark for semiconductors, GFI provided a “Statement of Use” declaration stating that it “is using the mark in commerce on or in connection with the goods/services identified above” PX0013.5. GFI further had to establish first use in U.S. commerce, and represented that “[t]he mark was first used by the applicant, or the applicant’s related company, licensee, or predecessor in interest at least as early as 06/18/2012, and first used in commerce at least as early as 06/18/2012, and is now in use in such commerce.” *Id.*; *see also* PX0012.5 (service mark).

The Trademark Act allows a registrant to rely on related companies to establish use in U.S. commerce. 15 U.S.C. § 1055, 1126; *Noble House Home Furnishings, LLC v. Floorco Enters., LLC*, 118 U.S.P.Q.2d 1413, 1421 (T.T.A.B. 2016). Mr. Abzug testified that he thinks

the use in question was “a combination of use between [GFI] and GlobalFoundries U.S.,” because the latter’s use as a licensee would “inure to the benefit of” GFI as the registrant. 6/13/18 AM 62:24–63:8. But he never testified that GFI itself manufactured, offered, or sold any chips of any kind, much less the accused devices, in any relevant period. Indeed, the uncontroverted evidence is that GFI did not engage in any “operational activities, *id.* 77:7-9, 79:16-19, and “has had no part in the manufacture, marketing, advertisement, importation, offer for sale or sale of FinFET devices.” *Id.* 79:1-11. There is thus no evidence whatsoever that GFI committed any infringing act with regard to the specific accused devices after the date of the complaint in 2016, and JMOL is proper as to GFI.

2. There is no basis to hold GFI liable for the acts of its affiliates.

In the absence of any direct infringement, the liability verdict cannot be sustained against GFI. Plaintiff stated no claim and presented no sufficient evidence of inducement, agency, alter ego, or joint infringement that would enable GFI to be held jointly liable for its affiliate’s alleged infringement. Nor did Plaintiff seek a jury instruction on any of those theories.

The Federal Circuit has emphasized that a corporation can be held liable for an affiliate’s “infringement under 35 U.S.C. § 271(a) only if the evidence reveals circumstances justifying disregard of the status of [the affiliated defendants] as distinct, separate corporations.” *A. Stucki Co. v. Worthington Indus., Inc.*, 849 F.2d 593, 596-97 (Fed. Cir. 1988) (finding no infringement without evidence that the parent company was an alter ego of the subsidiary or controlled the conduct of the subsidiary). Each corporation is entitled to “an individualized determination of [its liability].” *F.T.C. v. Kuykendall*, 371 F.3d 745, 758 (10th Cir. 2004); *see Marshall v. H & R Block Tax Servs., Inc.* 564 F.3d 826, 828 (7th Cir. 2009). Because a defendant is liable only for its own acts, and Plaintiff did not present any theory under which the corporate form could be disregarded and liability imposed for acts of its affiliates, JMOL should be granted to GFI.

There is no evidence that GFI waived its right to an individualized determination of liability or consented to joint-and-several liability for any infringement by its corporate affiliate. GFI moved for summary judgment, Dkt. 223, and both parties adduced evidence regarding its liability, *supra* at 18-19. This Court faulted Defendants for not objecting to its preliminary instruction, 6/15/18 AM 8:6-13, but all the Court said there was that “throughout the course of the trial you *may* hear these two Defendants referred to collectively as either GlobalFoundries or as the GlobalFoundries Defendants.” *Id.* 11:2-10. Nothing before the final jury instructions signaled that the Court would require a collective verdict for the Globalfoundries defendants.

In *Riddell Sports*, the Fifth Circuit rejected the claim that a plaintiff could escape its burden of proving individual liability of affiliates by shifting the burden to the defendants to disprove collective liability. There, the plaintiff (as here) convinced the district court to instruct the jury to determine liability of three affiliated corporate defendants (AA, RI, RSIO) collectively, and the jury returned a verdict against all defendants. 247 F.3d at 572. The Fifth Circuit reversed and remanded because there was no argument that supported disregarding the defendants’ separate corporate form:

The evidence showed that AA is a separate corporation from RI. Although both AA and RI are owned by RSI, a holding company, plaintiffs did not argue that defendants were alter egos, that they were agents of each other, or that the corporate veil should be pierced. Absent proof of one of these conditions, the corporate form must be respected.

Id. at 573. The Fifth Circuit rejected the plaintiffs’ argument “that defendants cannot object to the combining of the defendants in the charge, because defendants invited the error by referring to themselves collectively.” *Id.* The Fifth Circuit reasoned that this had the burden backwards:

[I]t is plaintiffs’ duty to prove each element of their *prima facie* case. Thus if combining two corporations into one is necessary to apply a strict liability standard, then plaintiffs must prove that the corporations should be combined, and sloppiness on the part of defendants does not excuse plaintiffs from this burden.”

Id. Though a new trial was granted because there was evidence under which a properly instructed jury could hold two of the defendants liable, the Court rendered judgment in favor of the parent corporation because there was no evidence that it committed tortious acts or that its corporate form could be disregarded. *Id.* at 577-78. This Court should also grant JMOL for GFI.

C. DEFENDANTS ARE ENTITLED TO JMOL ON INVALIDITY

JMOL of invalidity is appropriate, as there is clear and convincing evidence that claims 1-6, 11-13, and 15-17 of the '055 Patent are invalid under 35 U.S.C. §§ 102, 103. 6/14/18 AM 72:17-22. Dr. Subramanian, Defendants' expert, testified that claims 1-6, 13, and 16-17 are invalid by U.S. Patent No. 5,844,278 ("*Mizuno*"). *Id.* 47:6-58:1 (claim 1), 59:12-60:21, 62:15-25 (claim 2), 63:1-15 (claim 3), 63:16-64:2 (claim 4), 64:3-18 (claim 5), 64:19-65:7 (claim 6), 67:10-69:6 (claim 13), 63:1-15, 71:21-72:7 (claim 16), 72:8-16 (claim 17); PX-1290.¹⁵

Defendants also presented clear and convincing evidence that claims 11, 12, and 15 of the '055 Patent are invalid as obvious. Dr. Subramanian demonstrated that claims 11 and 12 are invalid as obvious in view of the combination of *Mizuno* and U.S. Patent Pub. No. 2002/0011612 ("*Hieda*"). *See* 6/14/18 AM 65:8-67:9. Dr. Subramanian also demonstrated that two different combinations render obvious claim 15—the *Mizuno-Hieda* combination (*id.* 69:7-70:21) and the combination of *Mizuno* and U.S. Patent No. 6,355,532 ("*Seliskar*") (*id.* 70:22-71:20); DX-275.

Plaintiff's entire rebuttal to Defendants' invalidity assertions was fundamentally flawed, based on the hovering "implant" feature of *Mizuno*'s first embodiment—a feature not relied on by Defendants for invalidity. Dr. Kuhn testified that the "signature feature in *Mizuno* which is

¹⁵ On October 31, 2018, Defendants requested from the United States Patent and Trademark Office ("PTO") an *ex parte* reexamination of the '055 Patent, which the PTO granted on December 21, 2018. *See* Dkt. 576 (Defendants' Notice of *Ex Parte* Reexamination).

illustrated . . . on the front page” is that “[r]ight in the middle is an implant that’s hovering.” 6/14/18 PM 124:16-125:16, 122:14-21 (identifying “*Mizuno*, PX1290”); PX1290 Front Page (showing hovering or floating implant 13). *Mizuno*’s front page indeed shows two figures, both with a hovering “implant” region 13, and both which correspond to Figures 4 and 5 of *Mizuno*’s first embodiment. *Compare id. with id.* Figs. 4, 5; *id.* 7:8-8:32 (*Mizuno*’s first embodiment relating to “high-concentration impurity region 13” formed by “implant” in the middle of projection of Figs. 4 and 5). But Defendants did not rely on this “implant” feature. 6/14/18 AM 47:6-75:20 (Subramanian) (no reliance on hovering “implant” feature, Fig. 4, or Fig. 5).

Though Defendants did not rely on a hovering “implant,” Dr. Kuhn focused on this feature in rebuttal. *See* 6/14/18 PM (Kuhn) 131:1-132:24 (disputing invalidity because *Mizuno* “is using this implant to control the short channel effects”), 142:25-143:15 (disputing invalidity because of *Mizuno*’s “hovering implant”), 154:15-155:1 (disputing invalidity because of *Mizuno*’s “hovering implant” while “*Hieda* has no implant in the middle”), 156:16-157:2 (disputing invalidity because of *Mizuno*’s “impurity region in the middle”); 150:16-25 (disputing invalidity because “this important shape that is so key to *Mizuno* with the floating implant”).

1. Claims 1-4 and 16-17 Are Invalid in View of Mizuno.

Plaintiff conceded that all but four claim limitations are disclosed by *Mizuno*. Its contentions on the disputed limitations were proven erroneous.

First, Dr. Kuhn contended that “*Mizuno* fails to disclose the bulk silicon substrate.” 6/14/18 PM 129:16-130:12. But on cross-examination, she conceded that *Mizuno* discloses a bulk silicon substrate. *Id.* 186:4-16; 6/12/18 PM 41:3-6, 42:12-14; *see* PX-1290 9:1-4, Fig. 8A.

Second, Dr. Kuhn contended that *Mizuno* does not disclose the “source/drain region, which is formed . . . except where said gate overlaps with the Fin active region,” but that “the source/drain would be diffusing under the gate.” 6/14/18 PM 132:25-134:20. But Plaintiff

offered no evidence showing that the source/drain in *Mizuno*'s second embodiment (relied on by Defendants) diffuses under the gate or is formed where the gate overlaps with the Fin. The evidence shows the opposite—*Mizuno*'s Fig. 8A shows the projection region 23 underneath the gate electrode 26 and shows no source/drain region there. PX1290 Fig. 8A. The source/drain is formed on both sides of the gate and not underneath the gate, as the gate blocks the source/drain from forming underneath the gate. *Id.*; 6/14/18 AM 55:24-56:15; 6/14/18 PM 34:8-35:2.

Third, Dr. Kuhn contended that *Mizuno* does not disclose the requisite “wall-shape” Fin active region because “[t]here’s no evidence in *Mizuno* that they have any intention of using the Fin shape and gates to create the fully depleted Fin active region.” 6/14/18 PM 131:1-132:24. But on cross-examination, Dr. Kuhn conceded that “full depletion” is “not a requirement of that [wall-shape] term.” *Id.* 186:17-24. Dr. Kuhn’s position is further undermined by the fact that she once again supported her position by pointing to *Mizuno*'s first embodiment (Fig. 5), which Defendants did not rely on for this limitation. *See id.* 131:1-132:24 (contending *Mizuno* which “is using this implant to control the short channel effects” does not meet this limitation).

Fourth, Dr. Kuhn contended that *Mizuno* does not disclose the “metal layer which is formed at said source/drain and gate contact region” as *Mizuno*'s “aluminum wiring is not one of the source/drain with a gate,” but is “sitting up further.” *Id.* 134:21-136:16. *Mizuno* expressly discloses otherwise: “a contact hole *reaching the source electrode, the drain electrode and the gate electrode* is formed on the film, and an *Al* [sic: “Al” - aluminum] *wiring* is disposed to complete an element.” PX1290 at 8:35-38 (emphasis added); 6/14/18 PM 35:25-36:17.

2. Claim 5 Is Invalid in View of Mizuno.

Dr. Kuhn suggested that *Mizuno* does not teach reducing “the parasitic capacitance between the gate and the bulk substrate.” *See* 6/14/18 PM 137:15-138:10. However, reducing “the parasitic capacitance between the gate and the bulk substrate,” according to the Court’s

claim construction order, is satisfied by a second oxidation layer thickness between 20 nm and 800 nm. Dkt. 179 at 32. Here, it is undisputed that the thickness of *Mizuno*'s "second oxidation layer" is between 20 nm and 800 nm. *See* 6/14/18 AM 64:3-18.

3. Claim 6 Is Invalid in View of Mizuno.

Dr. Kuhn suggested that claim 6 is not invalid because "*Mizuno* does not teach reducing the contact resistance by selecting the contact size to be greater than the width of the Fin or the length of the gate." 6/14/18 PM 138:11-139:11. But the Court found "the contact resistance is reduced" merely by selecting the contact size to be greater than the fin width. Dkt. 179 at 35-36. Here, *Mizuno*'s contact size is undisputably greater than the fin width. 6/14/18 AM 64:19-65:7.

4. Claim 13 Is Invalid in View of Mizuno.

Dr. Kuhn opined that *Mizuno* discloses "straight" Fin active region sidewalls and does not disclose "enlarging the width of said Fin active region within the oxidation layer as it approaches the bulk substrate." 6/14/18 PM 140:22-141:21. But, *Mizuno* indisputably shows its side-walls tapered outwardly. *Id.* 35:7-24; 6/14/18 AM 67:10-69:6; PX1290 (*Mizuno*) Fig. 18.

Dr. Kuhn also noted that "*Mizuno* does not discuss reducing the resistance by enlarging." *See* 6/14/18 PM 142:25-143:4. But claim 13's recitation of "the resistance of said Fin active region is reduced" is a statement of purpose and, thus, not a structural limitation of the claims. *See Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 809 (Fed. Cir. 2002).

5. Claims 11, 12, and 15 Are Invalid.

Dr. Kuhn's rebuttal to Defendants' arguments on these claims again were based on the hovering "implant" feature of *Mizuno*'s first embodiment (Figs. 4, 5), which Defendants did not rely on. 6/14/18 PM (Kuhn) 149:23-151:3 (*Mizuno-Seliskar* combination), 152:23-157:21 (*Mizuno-Hieda* combination). Defendants relied on *Mizuno*'s second embodiment (Fig. 8A). 6/14/18 AM 65:8-67:9, 69:7-71:20. Defendants' combinations are unrebutted.

a. Claims 11 and 12 Are Invalid Based on Mizuno-Hieda.

Dr. Kuhn pointed to the “impurity region in the middle” in *Mizuno*’s first embodiment to contend that a skilled artisan would not combine *Mizuno* and *Hieda*. 6/14/18 PM 156:16-157:2, 154:15-155:17 (disputing obviousness over *Mizuno* and *Hieda*: “recall from *Mizuno*, we have this architecture with this hovering implant. . . . *Hieda* has no implant in the middle [T]here’s nothing in there that’s equivalent to this hovering implant.”), 126:10-21. This “impurity region in the middle” or “hovering implant” is only a feature of *Mizuno*’s first embodiment—and not its second, on which Defendants relied. 6/14/18 AM 65:8-67:9; DX-279.

b. Claim 15 Is Invalid Based on Mizuno-Hieda or Mizuno-Seliskar.

Dr. Subramanian identified express motivations to combine these references in the prior art. *See* 6/14/18 AM 69:7-70:21 (motivation for *Mizuno-Hieda* combination), 70:22-71:18 (motivation for *Mizuno-Seliskar* combination). Dr. Kuhn recognized these motivations, testifying “the Defendants have discussed the breakdown features, and *those are important features* in our technology generations.” *See* 6/14/18 PM 156:1-3 (emphasis added). But Dr. Kuhn once again pointed solely to the “floating implant” feature of *Mizuno*’s first embodiment (not relied on by Defendants) as a lack of motivation for one of ordinary skill to chamfer the corners of *Mizuno*’s fin. 6/14/18 PM 150:16-25, 155:18-156:12, 154:15-155:1.

Regarding the *Mizuno-Seliskar* combination, Plaintiff also contended that claim 15 is not obvious because *Seliskar* is a planar device, “teach[ing] away from FinFET design.” 6/14/18 PM 148:11-149:4. This unsupported conclusion is plainly without merit as Dr. Kuhn admitted that features on a planar device can be applied to a FinFET. *Id.* 186:25-187:11.

V. CONCLUSION

For the foregoing, Defendants respectfully request that the Court grant this motion.

Dated: February 8, 2019

Respectfully submitted,

/s/ Allan M. Soobert

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing document was filed electronically in compliance with Local Rule CV-5 on this 8th day of February, 2019. As of this date, all counsel of record have consented to electronic service and are being served with a copy of this document through the Court's CM/ECF system under Local Rule CV-5(a)(3)(A) and by email.

/s/ Allan M. Soobert
Allan M. Soobert

CERTIFICATE OF AUTHORIZATION TO SEAL

I hereby certify that under Local Rule CV-5(a)(7), the foregoing document is filed under seal pursuant to the Court's Protective Order entered in this matter.

/s/ *Allan M. Soobert*

Allan M. Soobert